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1 Introduction

The aim of this paper is to provide a comparative analysis of two texts (Appendices 1 & 2) utilizing a systemic approach based on the principles of functional grammar (hereafter abbreviated to FG) popularized by Halliday and others.

A casual scan of both texts reveals two notable features: 1) a similarity in topic (the biological effects of alcohol) and 2) a difference in complexity of language and writing style (suggesting that the texts were written for both different purposes and audiences). The analysis conducted in this paper aims to provide both evidence and explanation for these initial impressions.

Having presented the findings of the analysis, the paper will then proceed to discuss the pedagogical value of FG. In closing, a summary of the difficulties encountered whilst analyzing the texts will be offered, as well as some suggestions for making such a text comparison more thorough and comprehensive.

2 Functional Grammar

Halliday proposes that there are three basic functions of language.

These basic functions are labeled Metafunctions so as to avoid confusion with the term ‘function’ commonly used by linguists to refer to a ‘purpose or way of using language’ (Halliday & Matthiessen, 2004: 31).

The logical organization of information in a text, that is to say how information is cohesively ordered to maintain continuity, is referred to as the Textual metafunction. The construal of human experience is accounted for by the Experiential metafunction. Finally, the interactive nature of a text always consisting of two parties, the reader and writer, is classified as the Interpersonal metafunction. FG takes a lexicogrammatical approach when analyzing these three metafunctions. For functional grammarians, lexis and grammar are considered inseparable, and are thus treated as one.

As Thompson (2004: 21) explains, the English language, be it spoken or written, can be divided into ranked categories. Below is a simplified version of the table Thompson uses to illustrate this.

Table 1 - Ranks

clauses
↓ e.g. /// Computer facilities are free of charge /// *are made up of one or more*
groups
↓ e.g. /// [computer facilities] [are] [free of charge] /// *are made up of one or more*
words
↓ e.g. /// [{computer} {facilities}] *are made up of one or more*
morphemes
↓ e.g. {<compute><er>} {<facility><s>} (*smallest unit of meaning*)

As can be seen from the above table, the clause is the highest ranked unit of meaning. Unlike the lower ranks, the clause is unique in that it represents a self-contained unit of meaning. Taken out of its context, a clause will still convey a comprehensible message. Mainly for this reason, FG focuses its analyses around the clause. This paper is no exception. Having identified all clauses in both texts, the paper will proceed to analyze these clauses and their functions with relation to the three metafunctions previously outlined.

3 Introduction of Texts

The first text (Appendix 1 – Pickled Livers) is taken from the monthly publication, the New Scientist. The New Scientist is a popular science magazine that publishes articles about current scientific developments and discoveries in a manner that can be understood by the general public. The easy to understand explanations in the New Scientist make it a popular source of information for British secondary school students.

The second text (Appendix 2 – The Neurophysiology of Alcohol) is taken from The Psychopharmacology of Alcohol. The title alone is an ample indicator of the highly specialist nature of this publication. Intended for a very specific and professional readership, technical terms are used extensively and a great deal of specialist knowledge on the part of the reader is assumed.

It would be natural to assume that Text 2 is the more complex of the two texts because of its highly academic and technical nature. However, there is a good case for arguing that Text 1 is in fact more

complicated. As Turner remarks:

> *'The writer in this genre is placed in the rather difficult position where she or he must meet the intellectual standards of their own discipline, present their subject matter in a way that is easily comprehensible to readers from other disciplines (or no particular discipline) and, most importantly, write in a way that arouses and maintains the interest of a reader who has little or no professional interest.'* (*1998*)

3.1　The Message of the Text (Textual Metafunction)

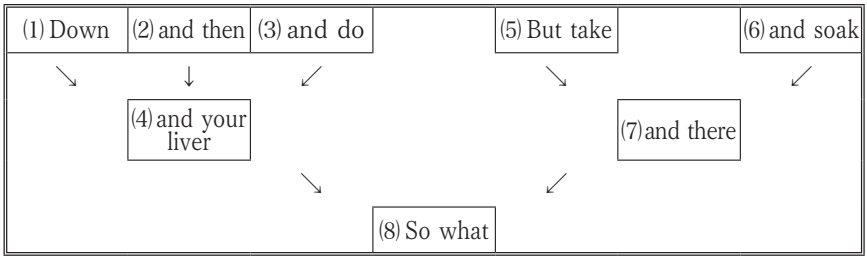
The message of a text is primarily realized through the Themes and subsequent Rhemes of the clauses therein. The Theme is always the first constituent of a clause. Often also the subject of the clause, the Theme can be of considerable length. The Theme always contains an experiential element, but can be preceded by textual (e.g. conjunctions) and interpersonal elements (e.g. modal Adjuncts and Vocatives) (Thompson, 2004: 159).

Whilst it is relatively easy to describe the features of a Theme, it is considerably harder to explain its function. As Thompson (2004: 143) warns, it is 'tempting' to assume that the Theme is what a clause is about but that this is not always the case. Halliday defines Theme as the 'point of departure of the message' (Halliday & Matthiessen, 2004: 64). Thus the Theme represents a starting point beyond which the message is fully realized in the Rheme. By identifying their respective Themes, it is hoped that insight to the construction and development of both texts will be acquired.

Text 1 is a five paragraph article about the effects of heavy drinking on the human liver. The article's author carefully organizes the information to accomplish a number of objectives. The Themes of the first paragraph, for example, establish the theme of the article as a whole.

The Themes found in the paragraph 2 serve a rather different purpose. Five of the eight Themes in paragraph 2 contain imperatives, all of which contribute to a sense of reader participation and engagement. The reader is placed into two imaginary processes (contrasted by the use of the adversative conjunctive adjunct 'but' in Theme 5) and shown the outcome of both. In the last Theme of the paragraph, the writer asks the question 'So what is going on?' (Theme = underlined) on behalf of the confused reader. This question also performs the function of building a cohesive link to the answer provided in the subsequent paragraph.

Table 2 – Thematic Flow of Text 1, Paragraph 2



It was remarked that there is a contrast of processes in Paragraph 2. Further analysis shows that contrast of Themes is a technique applied throughout the text. As Table 3 illustrates, Themes are repeatedly contrasted in every paragraph. This contrast is achieved by way of conjunctions (highlighted in bold in Table 3) and acts

to show the reader that alcoholic hepatitis is not an inevitable outcome. Furthermore, each instance of Thematic contrast in the text reinforces the very first Rheme 'the end of one size-fits-all boozing guidelines'.

Table 3 – Thematic Contrast in Paragraphs 3, 4 & 5 of Text 1

Contrast in Paragraph 3			
Whether you	'll succumb to liver disease	or survive	a lifetime of propping up the bar.
Theme	**Rheme**	**Theme**	**Rheme**
Contrast in Paragraph 4			
A third of heavy drinkers…	…develop alcoholic hepatitis	**But** because there	are few nerves in the liver,
Theme	**Rheme**	↓	
		most people	have no idea that alcohol is messing with theirs
		Theme	**Rheme**
Contrast in Paragraph 5			
and disappear	with abstinence	**Yet** continue	drinking heavily…
Theme	**Rheme**	↓	
		…your liver	may suddenly become inflamed
		Theme	**Rheme**

Thematic contrast can also be found in Text 2, albeit to a lesser extent. Table 4 shows where this contrast occurs. In both instances, Thematic contrast, created by using 'however', is used to show the disparity between theory (theory-based assumptions and predictions of scientists) and reality (results of experiments). The instance of contrast in paragraph 2 is of interest for an additional reason. Berry and Penreath (Text 2's authors) refer to '*our* limited knowledge' (my italicization), this could of course be attributed to there being two writers but, in a text which is otherwise devoid of human pronouns, seems to place the reader on an equal academic standing with the writers and create a sense of academic inclusion.

Table 4 – Thematic Contrast in Text 2

Contrast in Paragraph 1			
It	seems probable…	**However,** considerable problems…	arise in studying these effects.
Theme	**Rheme**	**Theme**	**Rheme**
Contrast in Paragraph 2			
Ideally, the experimenter	would like to correlate actions…	**However,** our limited knowledge of normal brain function	means that…

Both paragraphs begin with Themes that reflect the level of accuracy and precision that is required of writers of this genre:

'The principal effects of acute dosage of ethyl alcohol' (Text 2, line 1)

and 'The actions of alcohol on the central nervous system (CNS)'(Text 2, line 5).

Evidence of this attention to detail can be found elsewhere in the text, notably in two occurrences of the exemplifying conjunctive adjunct ‘for example’. In both instances, this textual Theme is used to provide supporting evidence for a claim made in the previous clause (s). In paragraph 2, this is of particular necessity as the writers have questioned the effectiveness of their peers’ research: ‘many investigators’ (8).

3.2　The Exchange of the Text（Interpersonal Metafunction）

In this section, the tenor of both texts will be analyzed to better understand the relationship between their respective authors and readers. It will be shown that these tenors are a product of the modes discussed in the previous section.

Of the two, Text 2 is simpler in terms of tenor. Text 2 is comprised entirely of declarative clauses. Text 1, by contrast, exhibits instances of not only declarative, but also interrogative and imperative clauses.

In Text 1 there are two interrogative clauses (Table 2). These questions have very important functions in the text. Both instances are rhetorical devices in that they do not invite or expect a response from the reader.

Text 1’s title ‘Pickled Livers’ is a deliberate play on words. Both words can commonly be found when talking about cooking: ‘pickled’ being the state of preservation after soaking in vinegar and ‘liver’ as an ingredient. In this article however, the ‘livers’ refer to those of humans and ‘pickled’ is used in the euphemistic sense of drunkenness. Such wordplay is often found in tabloid newspaper

headlines, used for its effectiveness in seizing readers' attention.

The first interrogative clause (shown in Table 5 below) has three key functions. Firstly, it provides explanation of the article's title 'boozing' and thus indication of what the article will be about. Second, the complement implies that at present there is only one set of alcohol consumption guidelines: 'one size fits all'. Last, the use of the modal 'Could' reduces the level of certainty, informing the reader that change is merely a possibility at this time.

Table 5 – Mood in first clause of Text 1

Could	it	be	the end of on size-fits-all boozing guidelines
Finite (Modal of possibility)	Subject	Predicator	Complement
Mood		**Residue**	

Having established the apparent paradox whereby a liver becomes swollen and damaged after extended periods of heavy drinking (line 2) yet fails to produce similar results when simulated in a laboratory (line 3), the writer poses the question 'Why?' (Table 6). The writer, conscious of his readers' (lack of) knowledge, anticipates that the explanation behind this phenomenon will be unknown to them and signals through the interrogative clause that the answer will now be provided. Furthermore, as Thompson writes about another author's use of rhetorical questions: 'one aspect is that the writer encourages the reader to accept him or her as able to ask questions on the reader's behalf, that is, as familiar and trustworthy' (Thompson, 2004: 82)

Table 6 – Interrogative in Text 1

So	what	is	going on?
	Subject	**Finite**	**Predicator**
	Mood		**Residue**

Also of note in text 1 is the use of imperatives. Imperatives reveal a lot about the relationship between the reader and writer. Usually, their function is to command and as such an assumption is made that the author has greater knowledge than that of the reader. Imperative structures are commonly found in instruction manuals and recipe books for example. In text 1 however, the intention is not for the reader to carry out the instruction. Closer inspection reveals two sets of instructions (Tables 7 & 8). Taken together they describe the paradox referred to earlier.

Table 7 – Imperative in Text 1（i）

Down	a few drinks
Predicator	**Complement**

↓

and	do	it	again the next night and the next
	Predicator	**Complement**	**Circumstantial Adjunct**

Table 8 – Imperative in Text 1（ii）

But	take	the main type of liver cell, hepatocytes
	Predicator	**Complement**

↓

and	soak	them	alone in the lab in alcohol
	Predicator	**Complement**	**Circumstantial Adjunct**

Clearly, the intention here is not for readers to actually carry out the commands. They are in fact being informed as to what would happen were they to do so. The function of the imperatives here then is to engage the readers by inviting them to imagine themselves in the circumstances described. Indeed, the readers need *only* imagine, as the consequences are stated explicitly in the declarative clauses that immediately follow both instructions. Text 1's author assumes a lack of specialist knowledge on the part of the reader and deems it appropriate to apply this instructional tone. Text 2, on the other hand, is written with a very different readership in mind and this is reflected in the mood choices made.

Text 2 contains no examples of imperative or interrogative clauses. Using only declarative clauses, it logically follows that the text' s key objective is to inform. However, the text is not simply a factual document, and with varying degrees of subtlety, the text is manipulated by the authors to convey implicit meaning and opinion.

Scientists, like most academics, are faced with the difficult task of writing objectively whilst expressing their own opinions. Halliday (2004: 616) claims that modality is used as a means of 'dissimulating the fact' that an opinion is being expressed. The authors of Text 2 employ such techniques to achieve just this. Indeed, no less than five processes in Text 2 are modified to reduce the level of certainty: 'It seems *probable'* (2), 'the drug *can* increase...' (4), 'alcohol *may* have opposite effects' (4), 'data *tends* to be' (7) and '*perhaps* exaggerating'. This could be interpreted as reflecting the unpredictable nature of scientific experiments, but more likely signifies the authors' intent to assert claims without fear of critical backlash.

3.3　The Representation of the Text（Experiential Metafunction）

Both texts were analyzed clause by clause in order to identify the participants and the processes they are engaged in. Table 9 presents the number of each type of process found in Texts 1 & 2. Appendices 3 & 4 show Texts 1 & 2 respectively broken down clause by clause with processes highlighted and categorized. Where possible, participants, goals, and circumstances have also been identified. This corresponds with the 'field' dimension of register and focuses attention on the 'content' of the text's message (Thompson, 2004: 86).

● **Process Types**

Having identified all clauses in both texts, a count of all the process types that occur could be carried out. The tally revealed some interesting findings. The New Scientist text contained 19 material processes, 6 relational identifying processes and 3 existential processes. It can be argued that this is proof of the magazine' s intention to present information in as simple and understandable manner as possible.

Processes are very closely related to, what most people recognize as, verbs. Verbs are often explained to elementary learners as 'doing' or 'action' words. These physical or concrete actions are the easiest concept for young learners to grasp and are categorized by linguists as prototypes. Material processes bear the strongest resemblance to this verb prototype and thus Text 1's heavy reliance on them suggests an intention to present information in a highly salient fashion. This,

in combination with the use of identifying and existential processes, gives the text a very factual tone that makes constant reference to the 'real' world.

Text 2 also contains a substantial number of material processes. This is to be expected from a text that is largely concerned with describing scientific experiments. As was mentioned in the 'Introduction of Texts' section, the writers of Text 2 assume extensive knowledge on the part of the reader. Definition of key terms is deemed unnecessary by the authors and this is reflected in the complete absence of existential processes and the occurrence of only one identifying relational process. Text 2 places far more importance on the description of experiment findings, causes and effects, which accounts for the high frequency of attributive relational processes.

Also of interest in Text 2 is the appearance of three verbal processes towards the end of the text: 'questioned', 'suggested' and 'exaggerated'. These processes are never attributed to an identified participant perhaps suggesting the authors' wish to express their own opinions behind an apparent display of scientific objectivity.

Table 9 - Process Types in Texts 1 & 2

Process Type →	Material	Behavioral	Mental	Verbal	Relational		Existential
					Attributive	Identifying	
Text 1 (Pickled Livers)	19	2	4	--	4	6	3
Text 2 (The Neuro-physiology of Alcohol)	8	--	2	3	12	1	--

● **Participants**

Text 1 is set firmly in the human world, specifically that of the reader. After an initial reference to the work of 'researchers', the text concerns itself almost entirely with the reader 'you', 'your' and 'heavy drinkers'. Readers are invited to imagine themselves as 'heavy drinkers' in clauses such as 'If you drink regularly...'

Text 2 on the other hand makes only three references to people in the text 'experimenter' (6), 'our' (7) and 'investigators' (8). Part of this can be attributed to the text's focus on zoology as opposed to the discussion of human biology in text 1. However, it is suspected that the absence of human participants is a deliberate choice made by the authors to give their composition a scientifically objective tone. As is the case with encyclopedias and instruction manuals for example, it is the impersonal nature of the text that gives it a factual and authoritative tone.

● **Grammatical Metaphor**

Another common method employed by scientific writers to heighten the sense of objectivity in their compositions is the use of grammatical metaphor. This term covers a fairly broad range of lexical combinations, but for the purpose of this paper's analysis the nominalization of verbal processes will be the focus of attention.

Text 1 contains only two examples of nominalization; 'accumulation' (8) and 'abstinence' (10). As discussed in the previous two sections, Text 1 is written in a very personal tone. The reader is repeatedly addressed directly and physical/ concrete material processes are employed extensively. The lexical choice 'accumulation' is particularly

noteworthy because of its location. Unlike the rest of the text which is very conversational in its tone, line 8 provides a succinct definition of a medical term. Here, the 'deverbalisation' of the clause adds authority to the writer's message.

By comparison, text 2 contains more than a dozen nominalizations; 'impairment' (1), 'tolerance' (2), 'dependence' (2), 'synthesis' (4), 'storage' (4), 'release' (4), 'inactivation' (4), 'stimulation' (5), 'interpretation' (8), 'production' (10), 'intoxication' (10), 'manifestations' (10) and again 'intoxication' (10). As remarked in the previous section, there is a notable absence of human participants in text 2. It is the high frequency of nominalizations that enables this. It is this nominalization that Thompson explains '...construes an objective world in which facts emerge unmediated by human consciousness...' (Thompson, 2004: 223).

Below the Clause

In the course of analyzing the texts in terms of processes, a striking feature became apparent: Text 1 contains a considerable number of phrasal verbs whilst Text 2 contains none. Since lexis and grammar are treated as inter-dependent in FG, this finding is of relevance. Halliday briefly discusses phrasal verbs but seems reluctant to give them more attention, dismissing them as 'grammatically...rather unstable' (Halliday & Matthiessen, 2004: 352). Defined as a type of verb that derives primarily from a verb of action or movement and an adverbial particle of direction and location, used literally, figuratively and idiomatically (McArthur, 1998), phrasal verbs have been shown

to have important implications for assessing the formality of a text （Dempsey et al, 2007）.

It could be argued that this observation belongs in a different type of analysis but was deemed worthy of inclusion because of its relevance to demonstrating how the two texts differ in terms of style and formality.

3.4　Analysis Conclusion

It is hoped that it has been demonstrated in each stage of the analysis that the two texts are different in terms of content, structure and purpose. This is achieved with little deliberate effort on the part of the writers and accepted with little or no thought on the part of the reader. FG confirms what native speakers instinctively know to be true and provides clear and concrete evidence. Described in further detail in the following section, this can be of particular value to those seeking to gain access to, or understanding of, a particular register i.e. ESL/EFL students.

4　Pedagogical Implications and Applications

As has been shown, a systemic analysis of a text reveals a great deal of information about its composition. However, if such findings are not used in some way then the process is meaningless. The following sections will present some possible uses for FG within a pedagogical context.

Assessment

FG has the potential to be a useful means of assessing student compositions. Arguably, the main criteria when assessing work is to what degree the task has been carried out satisfactorily. Secondary to this are factors such as proper use of syntax and spelling. These aspects of a paper should be relatively easy for a competent marker to evaluate. To what extent a paper conforms to the stylistic norms of its register is also of importance but considerably more difficult to assess. However, consideration of a student's composition in the light of the three metafunctions provides assessors with clear criteria for evaluating this aspect of a paper. Ultimately, responsibility remains with the assessor in deciding whether or not conformity to the register is something to be rewarded.

Reading (comprehension)

Student understanding of systemics and the analytical techniques it employs could facilitate higher and, eventually, faster reading comprehension. It is the experience of many ESL & EFL teachers that students are often overwhelmed when presented with a page or more of text. However, by breaking a text down into clauses students are given access to 'digestible chunks' of information. Each of which contain the key components necessary for comprehension i.e. the actors/ participants, the processes they are engaged in and the circumstances under which they take place.

Reading (interpretation)

In section 3.2 the interpersonal metafunction was discussed, as were

its consequences for the tenor of a text. Often EFL/ ESL students have difficulty accessing texts because they lack knowledge of the context they were written in. It is hoped that it was shown how the mood of a text can reveal much about the relationship between reader and author. Should a student likewise be able to identify mood in a text, they too will hopefully be able to make assumptions about the reader-writer relationship. Thus, FG not only aids comprehension as discussed in the previous section, but can also illuminate the subtext.

Access to the Language of Education

Student familiarity with academic literary conventions and register features may make texts more accessible and thus facilitate accelerated learning. It is quite likely that students are able to comprehend the content of a text but are barred from doing so by the complexity of language used to express it. FG has important lessons for both textbook writers and the teachers that use them as to how to organize and provide access to information.

5　Conclusion

Overall, the analysis proved to be an illuminating experience revealing a lot about two relatively short texts.

Central to the analysis carried out for the purposes of this paper was the identification of all clause boundaries in both texts. Having never done this before, I could not be sure of my accuracy. Particular difficulty was experienced when ‘downranked’, subordinate and

embedded clauses were encountered. Perhaps a more complete understanding of the workings of clauses would have revealed more information relevant to this paper.

It became clear through the course of producing this paper that everything in a text can be categorized and accounted for in the process of an FG based analysis. Halliday in particular goes to great lengths to provide extensive examples of each category he describes. However, during the course of analyzing texts 1 & 2, numerous difficulties were encountered in determining what category certain words or groups should be included in.

Furthermore, determining where Themes end and Rhemes begin was not always a simple procedure. Consulting the works of authorities on FG only served to make matters more confusing.

Identifying process types was, by comparison, fairly simple. Halliday provides extensive explanation of each type of process and suggests questions one can ask to check whether a process is of the type you believe it to be. The majority of the time this explanation sufficed but difficulty was experienced in a few instances e.g. 'The actions of alcohol on the central nervous system (CNS) have been **assessed** by a variety of different electrophysiological measures...' (Text 2, line 5). Eventually, it was decided in this case that the process is a material one because it can answer the question 'What was done to the actions of alcohol?' However, because the actions do not change as a result of the process, it was felt that the process should perhaps be categorized as mental perceptive.

Shortcomings of my functional grammar based analysis

In addition to further study to better understand the areas where difficulty was encountered, there were several considerations that were either overlooked or deemed unfeasible given the constraints of the assignment that could have improved the findings and conclusion of this paper.

This paper fully accepts the principle of FG that the clause is the base unit of language in any given text and the analysis was carried out accordingly. However, it was felt that study of the texts both above and below the clause level might have also revealed valuable information. It is suspected that examining the text at word level would have provided meaningful results.

Conversely, broadening the scope of the analysis to include other texts of similar topic/ content was also believed to have merit. More specifically, use of corpus data would have perhaps provided evidence of register-defining structures. Likewise, rather than focusing exclusively on the texts, consideration of external socio-political influences (as genre analysis prescribes) may also have provided insight to their composition.

Appendix 1

Text 1 - Pickled Livers

(1) Could it be the end of one size-fits-all boozing guidelines as researchers finally get into their stride?

(2) DOWN a few drinks, and then a few more, and do it again the next night and the next, and your liver may end up inflamed and scarred. (3) But take the main type of liver cell, hepatocytes, and soak them alone in the lab in alcohol at the kinds of concentrations found in a drinker's blood, and there are no signs of this kind of damage. (4) So what is going on?

(5) It turns out that it isn't the alcohol itself that destroys the liver, but the toxic free radicals and inflammatory substances released as the body struggles to deal with it. (6) What's more, the severity of this response varies greatly from to individual to individual. (7) The efficiency of Your[1] [sic] alcohol-metabolising enzyme, your diet, your Sex[2] [sic], the strength of your immune response and, most surprising of all, the number and type of bacteria that live in your gut may all determine whether you'll succumb to liver disease or survive a lifetime of propping up the bar.

(8) A third of heavy drinkers – loosely defined on both sides of the Atlantic as those who put away more than five or six drinks a day – develop alcoholic hepatitis, a life-threatening inflammatory condition, and a fifth get the fatal accumulation of scar tissue that is cirrhosis. (9) But because there are few nerves in the liver, most people have no idea that alcohol is messing with theirs until the damage is it in[3] [sic]

advanced stage.

⑽ If you drink regularly for a few weeks, deposits of fat will build up in your liver. These are probably harmless, and disappear with abstinence. ⑾ Yet continue drinking heavily, and for reasons that no one really understands, your liver may suddenly become inflamed, your abdomen will start to hurt all over, and you will feel sick. ⑿ This is alcoholic hepatitis.

New Scientist, 27/11/99: 64

[1, 2] The capitalization of the first letters in 'Your' and 'Sex' is assumed to be accidental

[3] it is suggested that 'in its' was the intended meaning here

Appendix 2

Text 2 - The Neurophysiology of Alcohol

*M.S. Berry and **V.W. Penreath

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(1) The principal effects of acute dosage of ethyl alcohol are observed in the nervous system, where there is a progressive and simultaneous impairment of function at many levels. (2) It seems probable that the tolerance and dependence which develop from chronic dosage are also due to changes in central nervous function. (3) However, considerable problems arise in studying these effects because of the complexity of the nervous system and also because of the diversity of the actions of alcohol on it. (4) For example, the drug can increase or decrease the synthesis, storage, release, and inactivation of central neurotransmitter sub-stances, and increase or decrease resting membrane potential and resistance, neuronal excitability, and postsynaptic receptor sensitivity; in each case, certain cells only are affected, and different concentrations of alcohol may have opposite effects.

(5) The actions of alcohol on the central nervous system (CNS) have been assessed by a variety of different electrophysiological measures, including spontaneous EEG, evoked potentials, multiple unit and single unit recording, intracellular recording, and electrical stimulation of specific brain areas. (6) Ideally, the experimenter would like to correlate the actions of alcohol on known neuronal networks with

particular changes in behaviour. (7) However, our limited knowledge of normal brain function means that experimental data tends to he[4] [sic] difficult to interpret. (8) As a consequence, many investigators have utilized a variety of peripheral vertebrate or isolated invertebrate preparations where neuronal connectivity is simpler and better understood than in the CNS, high resolution techniques can be more readily applied, and interpretation of the actions of alcohol is more reliable. (9) The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies have frequently been questioned. (10) For example, the concentrations of alcohol employed have often been well beyond those associated with the production of intoxication in mammals, suggesting fundamental differences in action and perhaps exaggerating the apparent role of the peripheral nervous system in the manifestations of intoxication.

from Sandler, M. (1980)
The Psychopharmacology of Alcohol. New York: Raven Press, p.43

[4] 'be' is assumed to be the intended word

Appendix 3

Process Analysis of Text 1

(1) Could it [Token] be [Relational - identifying] the end of one size-fits-all boozing guidelines [Value]
as researchers [Senser] finally get into [Mental - cognitive] their stride [Phenomenon]?
(2) DOWN [Material] a few drinks [Goal],
and then [implicit – Material] a few more [Goal]
, and do [Material] it [Goal] again the next night and the next,
and your liver [Carrier] may end up [Relational - attributive] inflamed [Attribute] and scarred [Attribute]
(3) But take [Material] the main type of liver cell, hepatocytes [Goal],
and soak [Material] them [Goal] alone in the lab in alcohol
at the kinds of concentrations [Token] found [Relational - identifying] in a drinker's blood [Value],
and there are [Existential] no signs of this kind of damage.
(4) So what [Actor] is going [Material] on?
(5) It turns out that it isn't [Existential] the alcohol itself
that destroys [Material] the liver [Goal],
but the toxic free radicals and inflammatory substances released [Material]
as the body struggles [Behavioural]
to deal [Material] with it [Goal].
(6) What's more, the severity of this response varies [Relational – attributive] greatly from to individual to individual.
(7) The efficiency of Your [sic] alcohol-metabolising enzyme, your

diet, your Sex [sic], the strength of your immune response and, most surprising of all, the number and type of bacteria that live [Relational - Identifying] in your gut
may all determine [Material]
whether you'll succumb [Behavioural] to liver disease
or survive [Behavioural] a lifetime of propping up the bar.
⑻ A third of heavy drinkers ** develop [Material] alcoholic hepatitis [Goal], a life-threatening inflammatory condition
*(embedded clause) loosely defined [material] on both sides of the Atlantic
*(embedded clause) as those [Actor] who put away [Material] more than five or six drinks [Goal] a day
and a fifth [Actor] get [Material] the fatal accumulation of scar tissue [Goal]
that [Value] is [Relational - identifying] cirrhosis [Token].
⑼ But because there are [Existential] few nerves in the liver,
most people have [Relational - attributive] no idea
that alcohol is messing [Material] with theirs
until the damage is [Relational – attributive] it in [sic] advanced stage.
⑽ If you [Actor] drink [Material] regularly for a few weeks,
deposits of fat [Goal] will build up [Material] in your liver.
These [Carrier] are [Relational - attributive] probably harmless [Attribute]
, and disappear [Material] with abstinence.
⑾ Yet continue drinking [Material] heavily,
and for reasons [Phenomenon] that no one [Senser] really

understands, [Mental - Cognitive]
your liver may suddenly become [Relational – Identifying] inflamed,
your abdomen will start to hurt [Mental – Perceptive] all over,
and you [Senser] will feel [Mental – Perceptive] sick. [Phenomenon]
⑿ This is [Relational – identifying] alcoholic hepatitis.

Appendix 4

Process Analysis of Text 2

⑴ The principal effects of acute dosage of ethyl alcohol are observed [Finite - Material] in the nervous system
,where there is [Finite - Relational Attributive] a progressive and simultaneous impairment of function at many levels.
⑵ It seems [Finite - Relational Attributive] probable
that the tolerance and dependence which develop [Non-finite – Material] from chronic dosage
are [Finite - Relational Attributive] also due to changes in central nervous function.
⑶ However, considerable problems arise [Finite - Material] ‖ in studying [Non-finite – Material] these effects because of the complexity of the nervous system and also because of the diversity of the actions of alcohol on it.
⑷ For example, the drug can increase or decrease [Finite – Material] the synthesis, storage, release, and inactivation of central neurotransmitter sub-stances,
and increase or decrease [Non-finite – Material] resting membrane potential and resistance, neuronal excitability, and postsynaptic receptor sensitivity;
in each case, certain cells only are [Finite Relational – Attributive] affected,
and different concentrations of alcohol may have [Finite Relational – Possessive] opposite effects.
⑸ The actions of alcohol on the central nervous system (CNS)

have been assessed [Finite – Material] by a variety of different electrophysiological measures, ‖ including [non-finite] spontaneous EEG, evoked potentials, multiple unit and single unit recording, intracellular recording, and electrical stimulation of specific brain areas.

(6) Ideally, the experimenter would like to correlate [Finite Mental – Emotion] the actions of alcohol on known neuronal networks with particular changes in behaviour.

(7) However, our limited knowledge of normal brain function means [Finite] that experimental data ‖ tends to be [Finite - Relational attributive] {sic} difficult ‖ to interpret [Non-finite – Material].

(8) As a consequence, many investigators have utilized [Finite] a variety of peripheral vertebrate or isolated invertebrate preparations
where neuronal connectivity is [Finite - Relational Attributive] simpler and better understood than in the CNS,
high resolution techniques can be [Finite Relational – Attributive] more readily applied,
and interpretation of the actions of alcohol is [Finite - Relational Attributive] more reliable.

(9) The value of these types of preparation as simple model systems and their relevance for mammalian CNS studies have frequently been questioned [Finite – Verbal].

(10) For example, the concentrations of alcohol employed [Non-finite – Material] ‖ have often been [Finite - Relational attributive] well beyond ‖ those associated [Non-finite?] with the production of intoxication in mammals, ‖ suggesting [Non-finite – Verbal] fundamental differences in action

and perhaps exaggerating [Non-finite - Verbal] the apparent role of the peripheral nervous system in the manifestations of intoxication.

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